



# Aviation Investigation Final Report

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<b>Location:</b>	Hemet, California	<b>Accident Number:</b>	WPR20LA135
<b>Date &amp; Time:</b>	April 30, 2020, 12:30 Local	<b>Registration:</b>	N6521Y
<b>Aircraft:</b>	Piper PA-23-250	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>	Flight control sys malf/fail	<b>Injuries:</b>	1 Fatal
<b>Flight Conducted Under:</b>	Part 91: General aviation - Other work use		

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## Analysis

The accident pilot and a second company pilot were flying in the same general area to photograph parcels of land. As the pilots were beginning their photography passes, the company pilot heard the accident pilot make distress calls on the radio. The accident pilot did not respond when asked to clarify the radio calls.

ADS-B data revealed the airplane approached the area to be photographed from the west, made a turn north to enter the area, then made a turn back to the southwest. The airplane then started a right descending turn about the time it intercepted its inbound course to the area. The last data captured the airplane, about 1,000 ft above the ground, about 177 knots groundspeed, in a 2,000 ft-per-minute descent, and about 950 ft northwest of the accident site. The camera system mounted in the airplane recorded the airplane, at that time, in a 31° nose-down attitude, and a 79° right roll.

The airplane struck steep mountainous terrain at a high speed, and the fuselage sustained substantial damage throughout. The wings, the vertical stabilizer, and the right side of the stabilator separated from the airplane.

Examination of the aileron control by the NTSB materials laboratory revealed that a cable had broken under fatigue in a location near the aileron control bellcrank, likely resulting in a loss of control of the airplane. The airplane was maintained in accordance with the operator's annual maintenance schedule; however, postaccident examination of the aileron control cable revealed that in addition to the fatigue break, multiple individual broken wires were discovered protruding from the strands, which would have required replacement of the cable upon discovery during required checks of the cable.

The toxicology report for the pilot identified positive results for a cannabis metabolite; however, amounts discovered were unlikely to have been impairing. Given the circumstances

of the accident, it is unlikely that the pilot's use of cannabis contributed to the accident and that the pilot lost control of the airplane due to the fatigue failure of the aileron cable.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

Maintenance personnel's failure to properly inspect and replace damaged aileron control cables, which resulted in fatigue separation of the aileron control cable and loss of control of the aircraft.

### Findings

<b>Aircraft</b>	Aileron control system - Fatigue/wear/corrosion
<b>Personnel issues</b>	Scheduled/routine maintenance - Maintenance personnel

## Factual Information

### History of Flight

#### Enroute

Flight control sys malf/fail (Defining event)

On April 30, 2020, about 1200, Pacific daylight time, a Piper PA-23-250 airplane, N6521Y, was substantially damaged when it was involved in an accident near Hemet, California. The pilot was fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 aerial survey flight.

According to a fellow company pilot flying a similar mission in the area, the accident pilot was tasked to photograph two parcels of land, identified as flight plan 223 (FP223), and flight plan 224 (FP224). The flight plans were to be flown north to south, at 8,500 ft msl +/- 300 ft mean sea level (msl), and at 120 to 130 knots groundspeed.

Examination of recorded camera data revealed the pilot had selected FP224 to photograph first. Prior to entering FP224, the pilot communicated with a fellow company pilot and stated that he was “about to be on station.” At a time between 1140 and 1210, the pilot made two distress radio calls.

Recorded automatic dependent surveillance-broadcast (ADS-B) data revealed the accident airplane departed CNO about 1131, climbed to an altitude of about 8,500 ft msl, established a ground speed of about 164 knots, and tracked southeast for about 42 miles. About 5 miles northwest of Diamond Valley Lake, the airplane descended to 8100 ft and decelerated to 130 knots before turning east. The airplane proceeded eastward for about 15 miles, passing near a Camp, a cleared area with several buildings located at the base of a valley. The airplane continued east for about 3 miles, then turned north, consistent with tracking toward the FP224’s southern boundary. About 1 minute later, and prior to entering FP224, the airplane began a left turn and a descent. During the left turn, the airplane traversed through FP223 to the southwest and maintained the new heading for about 3.5 miles, until crossing over the Camp again. From there, the airplane began a right turn and continued to descend. The last data point recorded at 1200, revealed the airplane about 4,400 ft mean sea level (msl), or 1,000 ft above ground level (agl), about 177 knots ground speed, and about 950 ft northeast of the accident site. Figure 1 shows the ADS-B derived flightpath.



Figure 1. Capture of ADS-B data. The blue arrows show the direction of flight.

Data captured from the onboard camera system recorded the entire flight and provided time, location, and flight data consistent with the ADS-B data. At 1200:02, the camera system revealed the airplane to be in a 31° nose-down attitude, and a 79° right roll. At 1158:02, the camera system recorded the airplane to be at 7,158 ft msl, 4° nose down, 11° right roll, and 150 knots.

### Pilot Information

<b>Certificate:</b>	Commercial	<b>Age:</b>	27, Male
<b>Airplane Rating(s):</b>	Single-engine land; Multi-engine land	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	Unknown
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	No
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	Yes
<b>Medical Certification:</b>	Class 2 Without waivers/limitations	<b>Last FAA Medical Exam:</b>	March 20, 2020
<b>Occupational Pilot:</b>	Yes	<b>Last Flight Review or Equivalent:</b>	September 22, 2019
<b>Flight Time:</b>	(Estimated) 1138 hours (Total, all aircraft), 379 hours (Total, this make and model), 972 hours (Pilot In Command, all aircraft), 228 hours (Last 90 days, all aircraft), 119 hours (Last 30 days, all aircraft), 3 hours (Last 24 hours, all aircraft)		

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Piper	<b>Registration:</b>	N6521Y
<b>Model/Series:</b>	PA-23-250	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>	1967	<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Normal	<b>Serial Number:</b>	27-3812
<b>Landing Gear Type:</b>	Retractable - Tricycle	<b>Seats:</b>	3
<b>Date/Type of Last Inspection:</b>	November 14, 2019 Annual	<b>Certified Max Gross Wt.:</b>	5200 lbs
<b>Time Since Last Inspection:</b>		<b>Engines:</b>	2 Reciprocating
<b>Airframe Total Time:</b>	9154.5 Hrs as of last inspection	<b>Engine Manufacturer:</b>	Lycoming
<b>ELT:</b>	C91 installed, not activated	<b>Engine Model/Series:</b>	IO-540-C4B5
<b>Registered Owner:</b>	Landcare Aviation Inc	<b>Rated Power:</b>	250 Horsepower
<b>Operator:</b>	Landcare Aviation Inc	<b>Operating Certificate(s) Held:</b>	None

The airplane was manufactured in 1967. According to the operator the airplane was maintained under an annual maintenance program. The last annual inspection occurred on November 21, 2019.

The airplane was modified in April 1994 to carry a Kodak Hite experimental camera system that was later changed to an Eagleview proprietary digital camera. The camera system recorded airplane flight parameters including pitch, roll, altitude, heading and speed.

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Visual (VMC)	<b>Condition of Light:</b>	Day
<b>Observation Facility, Elevation:</b>	KHMT, 1514 ft msl	<b>Distance from Accident Site:</b>	12 Nautical Miles
<b>Observation Time:</b>	19:55 Local	<b>Direction from Accident Site:</b>	300°
<b>Lowest Cloud Condition:</b>	Clear	<b>Visibility:</b>	10 miles
<b>Lowest Ceiling:</b>	None	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	7 knots /	<b>Turbulence Type Forecast/Actual:</b>	None / None
<b>Wind Direction:</b>	200°	<b>Turbulence Severity Forecast/Actual:</b>	N/A / N/A
<b>Altimeter Setting:</b>	29.93 inches Hg	<b>Temperature/Dew Point:</b>	28°C / 9°C
<b>Precipitation and Obscuration:</b>			
<b>Departure Point:</b>	Chino, CA (KCNO)	<b>Type of Flight Plan Filed:</b>	None
<b>Destination:</b>	Chino, CA (KCNO)	<b>Type of Clearance:</b>	VFR
<b>Departure Time:</b>	11:30 Local	<b>Type of Airspace:</b>	Class E

## Wreckage and Impact Information

<b>Crew Injuries:</b>	1 Fatal	<b>Aircraft Damage:</b>	Substantial
<b>Passenger Injuries:</b>		<b>Aircraft Fire:</b>	On-ground
<b>Ground Injuries:</b>	N/A	<b>Aircraft Explosion:</b>	Unknown
<b>Total Injuries:</b>	1 Fatal	<b>Latitude, Longitude:</b>	33.618057,-116.865554(est)

Examination of the accident site revealed that the airplane impacted steep mountainous terrain and came to rest inverted about 15 miles west of the intended aerial survey area. The debris path was about 240 ft in length, oriented downhill on a heading of about 239°. The first identified point of impact was a shallow indentation in sandy soil at the top of the ridgeline at an altitude of 3,606 ft MSL.

The fuselage exhibited substantial damage throughout its entirety.

The right propeller was not found at the accident site. Examination of the fracture site was consistent with overload separation.

Post-accident visual examination of the aileron control cable exhibited multiple broken wires protruding from the strands and a separation fracture located between the left aileron bellcrank and the cable junction for the control yokes. Examination of the cable by the NTSB materials laboratory revealed the cable consisted of six strands wrapped about a central core



strand. All the strands had fractured in approximately the same location, perpendicular to the cable direction. Two of the strands exhibited little fraying of the wires, whereas the other four exhibited local fraying upwards of 0.5 inch from the fracture surface. The core strand exhibited fraying several inches from the fracture surface. Further examination revealed numerous wires fractured by overload and others fractured by fatigue, with some cracked by fatigue and then fractured by overload. Figure 2 is showing the fracture of the aileron cable, and Figure 3 is showing an example of the broken wires on the aileron control cable.

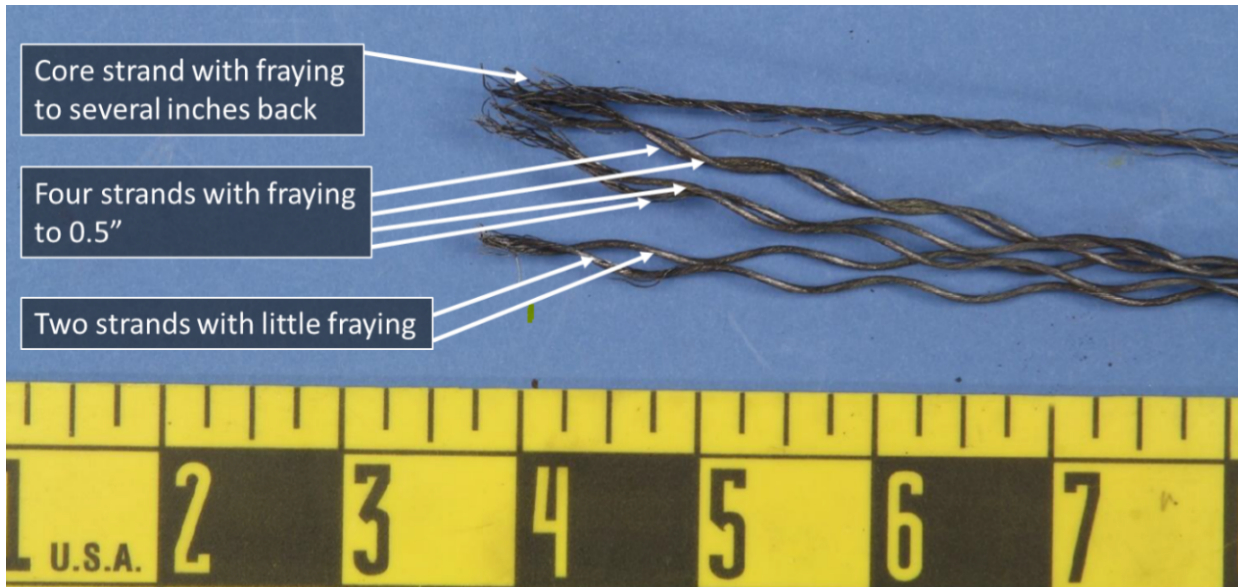


Figure 2. View of the aileron control cable.



Figure 3. The aileron control cable, showing frayed wires.

### Medical and Pathological Information

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Toxicology testing performed by the FAA Forensic Sciences Laboratory detected tetrahydrocannabinol (THC), the primary psychoactive compound in cannabis, and its primary metabolite 11-hydroxy-delta-9-THC in the pilot's urine at 0.9 nanograms per milliliter (ng/mL) and 12.3 ng/mL, respectively; neither were detected in his cavity blood or liver tissue. THC's inactive metabolite carboxy-delta-9-tetrahydrocannabinol (THC-COOH) was detected in the pilot's cavity blood, urine, and liver tissue at 7.1 ng/mL, 89.9 ng/mL, and 376.2 nanograms per gram, respectively. Toxicology testing performed for the coroner's office was positive for cannabinoids in the pilot's blood.



## Additional Information

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Piper Aztec service manual Annual/100 Hour Inspection Procedure states in part,

F. Wing group.

Note 9. Examine cables for broken strands by wiping them with a cloth for the entire length. Visually inspect the cable thoroughly for damage not detected by the cloth. Replace any damaged or frayed cables.

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Salazar, Fabian
<b>Additional Participating Persons:</b>	Kathryn Whitaker; Piper Aircraft; Phoenix, AZ Dan Corallo; Riverside FSDO; Riverside, CA Mark Platt; Lycoming Engines; Phoenix, AZ
<b>Original Publish Date:</b>	March 11, 2022
<b>Last Revision Date:</b>	
<b>Investigation Class:</b>	<a href="#">Class 3</a>
<b>Note:</b>	The NTSB did not travel to the scene of this accident.
<b>Investigation Docket:</b>	<a href="https://data.nts.gov/Docket?ProjectID=101220">https://data.nts.gov/Docket?ProjectID=101220</a>

The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in other modes of transportation—railroad, transit, highway, marine, pipeline, and commercial space. We determine the probable causes of the accidents and events we investigate, and issue safety recommendations aimed at preventing future occurrences. In addition, we conduct transportation safety research studies and offer information and other assistance to family members and survivors for each accident or event we investigate. We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and US Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, “accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties ... and are not conducted for the purpose of determining the rights or liabilities of any person” (Title 49 *Code of Federal Regulations* section 831.4). Assignment of fault or legal liability is not relevant to the NTSB’s statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report (Title 49 *United States Code* section 1154(b)). A factual report that may be admissible under 49 *United States Code* section 1154(b) is available [here](#).